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Publication date:
2014

Document Version
Peer reviewed version

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Citation (APA):

Mark, C., Zor, K., Heiskanen, A., Dufva, M., Emnéus, J., & Finnie, C. (2014). *Programmed cell death: The life ambition of the barley aleurone layer*. Abstract from 1st INPPO World Congress on Plant Proteomics, Hamburg, Germany.

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Programmed cell death: The life ambition of the barley aleurone layer

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We have developed a 24-well multiplate tissue culture system with electrochemical and optical detection techniques for cultivation of immobilised barley aleurone layers. We have applied the system for the purpose of studying the underlying mechanisms of programmed cell death (PCD) in plants.

We have optimised an electrochemical, intracellular, whole-cell redox activity assay [1] that probes the NAD(P):NAD(P)H ratio via a double-mediator system. Experiments show that redox activity changes depend on phytohormone activation or inactivation of aleurone layer metabolism and subsequent PCD.

We have successfully applied a fluorescent double-probe system [2] to detect PCD to ensure that our redox activity data match with known responses of barley aleurone layers to phytohormones.

We have also used the system for transformation of barley aleurone cells with α -amylase-GFP constructs for the purpose of studying the timing of α -amylase production in relation to PCD. These studies will be combined with activity assays and quantitative proteomics studies of α -amylase and other target enzymes.

[1] Heiskanen et al., 2009, Anal Biochem, 384, 11-19

[2] Fath et al., 2001, Plant Physiol, 126, 156-166

Keywords:

Barley aleurone layer, redox activity, programmed cell death, plant tissue culture

Remark / Message to the Program Committee and Chairs:

In case this abstract should be chosen for oral presentation: Quantitative proteomics studies are planned for August/September and can therefore not be guaranteed performed and analysed for the Congress. Despite this, I would be happy to give a presentation of the work already performed.